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*Response Letter and change pages to
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BY FACSIMILE AND FIRST CLASS MAIL

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Mr. David Healy
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Dear Mr. Sochanski, Ms. Nadolski, and Mr. Healy:

Please find enclosed revised pages of the Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPjP) for the Limestone Road Supplemental Remedial Investigation/Feasibility Study (SRI/FS) addressing the USEPA's comments of November 20, 1991. To reduce the volume of paper submitted, and to expedite the review process, only revised pages are being submitted. Revised copies of the FSP and QAPjP will be produced in their entirety and submitted to the USEPA following the Agency's approval of the changed pages. A summary of the responses for each comment has been prepared and is provided in

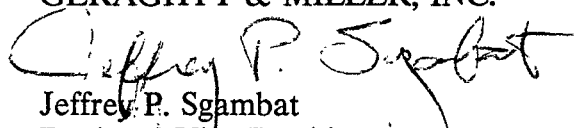
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Attachment 1. Should you have any questions regarding the revisions to the FSP or the QAPJP, please feel free to contact us.

Yours truly,
GERAGHTY & MILLER, INC.


Jeffrey P. Sgambat
Regional Vice President

JPS:
Enclosures

cc: Tracy Getz, Esq.
Philip Andrews, Esq.
W. Stevens Hidey, Esq.
Mr. Charles S. Steiner

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ATTACHMENT 1**RESPONSES TO USEPA COMMENTS (NOVEMBER 20, 1991) REGARDING THE REVIEW OF THE LIMESTONE ROAD SRI/FS FIELD SAMPLING PLAN (FSP) AND QUALITY ASSURANCE PROJECT PLAN (QAPjP)**

Hazardous Waste Enforcement Branch

Specific Comments Regarding the FSP

1. Sections 2.2.4 and 5.3.4.2 have been revised to reflect the deletion of the words, "minimum of one".
2. The Agency's comment states that the proposed field screening utilizing a photoionization detector (PID) is "...not as accurate as it can be ..." and indicates that the selection of samples that will be sent to the laboratory would therefore be biased. For these reasons, the Agency requires that a flame ionization detector (FID) such as the organic vapor analyzer (OVA) be utilized for field screening. The PID and OVA operate according to different principles and have different relative responses for a given constituent. In the survey mode which would be utilized for field screening, the readings from neither the PID nor the OVA indicate actual concentrations since the substances being monitored are unknown and the relative response of the instrument cannot be accounted for. Considering this fact, the OVA has no inherent accuracy benefit over the PID when these instruments are used for field screening.

Since the objectives of the field screening can be effectively accomplished using either an OVA or a PID, the instruments identified in the FSP have been modified. Specifically, Section 2.2.4, Section 5.3.4.2, and SOP 15 have been revised to reflect the use of an OVA in conjunction with a CGI.

Specific Comments Regarding the QAPjP

1. The references to USEPA Contract Laboratory Program (CLP) Statements of Work (SOWs) for organic sample analyses have been changed to specifically mention USEPA CLP SOW OLM01.08 entitled, Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration¹ for organic analyses (other than those requiring low detection limit methods such as USEPA Method 524.2). References to the inorganic protocol has been changed to USEPA CLP SOW ILM02.0 entitled, "Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration." These revisions have been added to the following pages and sections of the QAPjP:

Section 3.1, page 17

Section 3.3, page 21

¹ Document Number OLM01.8 includes Revisions OLM01.1 (December 1990), OLM01.2 (January 1991), OLM01.3 (February 1991), OLM01.4 (March 1991), OLM01.5 (April 1991), OLM01.6 (June 1991), OLM01.7 (July 1991), and OLM01.8 (August 1991).

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Section 3.5, page 24
Section 7.1, page 34
Section 8.2, page 36
Section 12.2, page 48

Section 6.3, page 32
Section 7.3, page 35 (3 places)
Section 8.5, page 39

2. Tables 5, 6, and 7 have been revised to reflect the analytes and quantitation limits established in USEPA CLP SOW OLM01.8. Tables 4 and 8 have been revised to reflect the analytes listed in USEPA CLP SOW ILM02.0. In addition, a reference for the specific USEPA CLP SOW from which the analytes and quantitation or detection limits have been listed are included in the referenced tables. The detection limits for Method 524.2 were discussed with the USEPA Central Regional Laboratory personnel. The quantitation limits for both residential and monitoring well samples presented on Table 5 of the QAPjP have been revised to be consistent with a document entitled, "Superfund Analytical Methods For Low Concentration Water For Organics Analysis," June 1991.

As discussed above, references to the USEPA CLP SOWs have been corrected to specifically identify USEPA CLP SOWs OLM01.8 and ILM02.0. The method references for compounds not included in the CLP analyte lists have not been revised, but will be specific for the method used.

3. SOP 14.0 in the FSP has been revised to detail the procedures for using the CGI during soil borings. As discussed above, the CGI will be used in conjunction with the OVA.
4. The QAPjP and the FSP have been modified to reflect analysis of monitor well samples using Method 524.2 in order to facilitate initiation of the SRI. Table 4, and sections 3.1, 3.3, 3.5, 6.3, 7.1, 7.3, 8.2, 8.5, and 12.2 have been revised to state that Organic and Inorganic analytes included in the USEPA CLP SOWs OLM01.8 and ILM02.0 will be analyzed by USEPA CLP SOW OLM01.8 and ILM02.0 methods, respectively. The quality assurance/quality control (QA/QC) limits and frequency for organic and inorganic analyses will follow those established in the USEPA CLP SOWs OLM01.8 and ILM02.0, respectively. The quantitation or detection limits for the organic and inorganic sample analyses will meet the Contract Required Quantitation Limits (CRQLs) or the Contract Required Detection Limits (CRDLs) established in USEPA CLP SOW OLM01.8 and ILM02.0. As discussed above, the quantitation limits for the analysis of low concentration volatiles by method 524.2 have been revised to be consistent with a document entitled, "Superfund Analytical Methods For Low Concentration Water For Organics Analysis," June 1991. The quantitation or detection limits for analytes (other than those discussed above with respect to USEPA CLP SOWs OLM01.8 and ILM02.0 and USEPA Method 524.2) have not been revised.

The Agency's comment states that 500 series methods (which yield detection limits below MCLs and non-zero MCLGs) will be required for analysis of residential and monitoring well samples so that the Agency will be able to evaluate present and future

risk associated with ground-water exposure. It should be noted that the Agency evaluated the risks associated with ground-water ingestion during the previous RI/FS conducted at the site². The Endangerment Assessment (EA) that was conducted as part of the RI concluded that the contaminants of concern for ground-water ingestion consists of inorganics including cadmium, lead, manganese, nickel, and zinc. Therefore, historical data for the site does not support the need to analyze monitoring well samples according to Method 524.2 in order to achieve lower detection limits for VOCs. Additionally, the EA did not indicate that the CLP data that were used for evaluating ground-water ingestion risks were inadequate for evaluating risk.

The Agency's comment also states that the analytical results from the monitoring well samples will be used to select which residential wells will be sampled. This is incorrect in that the criteria for selecting residential wells to be sampled include historical analytical data, proximity to the site, well depth, and the hydrogeologic data collected during the initial field work of the SRI (see Section 3.1 of the FSP).

²CH2M Hill, "Remedial Investigation Report, Volume 1 of 2, Limestone Road Site, Cumberland, Maryland," August 8, 1986.

2.2.4 Fill Material

Section 3.2.4 of the Work Plan states that the primary objective of the fill material sampling is to supplement the existing database to determine the vertical and horizontal extent of hazardous-fill material at the site. The results of these analyses will be used for evaluating the appropriate location of the caps. The fill material sampling program includes collection and analysis of surface-soil samples, and soil borings. The samples will be collected from the areas assessed in the Work Plan, which are shown on Figures 3.3 and 3.4 of this document.

The specific objectives of fill sampling are:

- Determine the extent of the caps necessary to cover the contaminated areas on the Diggs and CC&SC properties by comparing the surface-soil sample data to the constituent target levels presented in the Work Plan (p. 15) and the results of Toxicity Characteristic Leaching Procedure (TCLP) tests. The target levels are: cadmium (1 ppm), chromium (1,000 ppm), and lead (100 ppm).
- Determine the depth of hazardous-fill material at each property by drilling two soil borings. This will be accomplished by collecting and inspecting continuous split spoons from each boring. Based on visual examination and field screening (described in Section 5.3.4.2), three samples from each boring will be sent to a laboratory for chemical analysis.

of Soils". Information on drilling methods, encountered water levels, and standard penetration test values will also be collected. The standard form to be used in logging soil sample descriptions is provided in Figure 5.3.

Soil samples collected in split-spoons from on-site soil borings will be split between two glass sample jars. One of the jars will be used for screening for volatile organics using a flame ionization detector (FID) such as the Organic Vapor Analyzer (OVA), while the other will be prepared for shipment to the analytical laboratory for chemical analyses. Methane will also be monitored using a combustible-gas indicator (CGI).

Field monitoring of soil cores will be performed by visual means and by using the OVA for organic-vapor analyses as described in SOP-15. Any samples indicating contamination will be collected for chemical analysis by the field hydrogeologist. This determination will be based on either 1) an increase in volatile-organic vapors significantly above background when measuring air in the headspace; and/or 2) if the sample contains visibly detectable signs of contamination (i.e., residues, discolored soils, etc.). Samples with either of these characteristics will be selected for chemical analysis. At least three samples from each test boring will be collected for chemical analysis.

Sample labels will be affixed to jars containing samples for laboratory analysis. Labels will identify sampling location, sample identification, date of collection, analysis, preservative,

SOP 14.0 - Soil Sampling From Borings

Scope:

The operating procedure describes the ways and means of obtaining a soil sample from boring via a split-spoon sampler.

Purpose:

The purpose of this procedure is to assure good quality control in field operations, uniformity between different field personnel, and to allow traceability of possible cause of errors in analytical results.

Equipment Needed:

Split-spoon sampler, tape measure, hand lens, sample/core log, log book, sample containers with labels, chain-of-custody record, knife or trowel, disposable gloves and plastic sheeting. A combustible gas meter (CGI) will also be needed to perform air monitoring during boring activities.

Calibration Procedures:

- 1) Turn on and calibrate the CGI according to the manufacturer's instruction manual provided inside the case. Check the instrument for proper response and deflection of the indicator needles (or LEDs) and for proper alarm operation according to the operating instructions.

Procedures:

- 1) During boring activities, utilize the CGI to check for emissions of explosive gases which may be emanating from the borehole. Record any positive readings on the boring log. After boring to the designated depth, place sheeting down near borehole.
- 2) Position split-spoon sampler over point to be sampled.
- 3) Hammer sampler as detailed in ASTM D 1586-84 "Penetration Test and Split-Barrel Sampling of Soils".
- 4) Count and record the number of blows required to penetrate 6 inches, 12 inches, and 18 inches.
- 5) Remove the sampler and extract the sample. If VOC is to be conducted on the

sample, immediately transfer it to a sample jar, leave no head space and tightly cap.

- 6) Examine and record sample description on sample/core log sheet. Make special note of any obviously contaminated zones.
- 7) Place sample in sample jar, label and record on Chain-of-Custody Record. Place in iced cooler.
- 8) Take a split spoon (if necessary) for either chemical analysis or for grain-size determinations.
- 9) Clean split-spoon sampler by dry brushing, followed by a Micro solution wash, followed by a rinse in potable and then distilled water.

SOP-15.0 Field Analysis of Soil-Sample Headspace for Volatile Organics

Scope: This procedure describes methodologies to be utilized in measuring organic vapors emitted from soils collected in split-spoon samplers. Results will be used to characterize volatile organic composition with depth and to select samples for chemical analysis.

Purpose: The purpose of this procedure is to maintain uniformity between field personnel performing the measurements and to ensure the representativeness of readings obtained.

Equipment Needed: Personal protective equipment, Foxboro model 128 Organic Vapor Analyzer (OVA), wide-mouth sample jars, plastic bags, rubber bands, field data forms.

Calibration Check

1. The OVA should be internally calibrated by the instrument supplier or lessor. This should be checked on receipt by the following procedure.
2. The instrument must be operated in accordance with the manufacturer's instruction manual. The manual is provided inside the instrument case and a summary is printed on the inside of the instrument cover. The battery must be tested before attempting to operate the instrument. If the battery is not properly charged, the instrument could be severely damaged during operation.
3. To use the OVA, the hydrogen storage tank inside the instrument must contain sufficient fuel. Since the hydrogen fuel is flammable and explosive, extreme care must be taken when charging the hydrogen cylinder in the OVA. This procedure must be performed in a well ventilated area. To charge the instrument with hydrogen, connect the hydrogen fill assembly to the external hydrogen supply tank and the inlet valve on the OVA. Open the valve on the instrument then on the external tank.
4. After charging the hydrogen cylinder and closing all valves, install the probe lines to the corresponding connections as directed in the manufacturer's instruction manual.
5. Turn the instrument function switch to the "ON" position and allow the electronics to warm up for approximately five minutes. After warm-up, turn on the vacuum

pump and check the gas flow rate according to the manufacturer's instructions. Activate the instrument by opening the hydrogen gas valve to the detector chamber, wait one minute, and depress the ignitor button. The needle on the probe gauge will deflect and a slight "pop" may be heard when the hydrogen ignites.

6. With the instrument set on the low range (1X), adjust the instrument reading to zero using the calibration knob.
7. To test the calibration, hook-up the probe to a supply of "zero" air to ensure that the instrument response remains at zero. Next, connect the probe to a tank containing approximately 100 ppm of methane gas and reset the instrument to the 10X response range. If the instrument has been properly calibrated by the supplier or lessor, the instrument reading should be within 10 percent of the true value of the standard gas. If the instrument reading is not within this control limit, contact the supplier or lessor to discuss corrective action.

Test Procedures

1. Split-spoon samples are collected as per ASTM Method D1586 and packaged in a wide-mouth sample jar. The jar is labeled to document boring number, depth range, time, date, and field personnel collecting the sample.
2. The glass jar is capped with a plastic bag and a rubber band.
3. The air-tight sample container is then allowed to warm for one hour to enhance the liberation of soil gases into the available jar headspace.
4. Puncture the top of the plastic cover with the OVA probe tube and allow the headspace gases to be drawn through the instrument.
5. Record the peak response exhibited by the OVA on an appropriate sampling log.
6. Remove the punctured plastic bag and seal the jar with the proper lid.
7. Allow the meter on the OVA to return to background and repeat procedure for next sample.

**3.0 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT
DATA IN TERMS OF PRECISION, ACCURACY, COMPLETENESS,
REPRESENTATIVENESS AND COMPARABILITY**

3.1 GENERAL

The overall QA objective for the SRI/FS is to ensure that all decisions based on laboratory and field data generated during this investigation are technically sound, statistically valid, and properly documented. To ensure this, all procedures utilized for collection of field and laboratory measurements along with the resulting data will be assessed for quality based on performance standards presented herein.

Specific procedures to be utilized for laboratory analyses, data reporting, and data validation, are presented in other sections of this QAPjP and will be at a minimum equal to the USEPA's Contract Laboratory Program (CLP), including methods from Superfund Analytical Methods for Low Concentration Water for Organics Analysis, 6/91, volatiles analysis based on USEPA method 524.2 as adapted for contract Laboratory Program (CLP) use; USEPA CLP SOW OLM01.08 Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration, Document Number OLM01.8 including Revisions OLM01.1 (December 1990), OLM01.2 (January 1991), OLM01.3 (February 1991), OLM01.4 (March 1991), OLM01.5 (April 1991), OLM01.6 (June 1991), OLM01.7 (July 1991), and OLM01.8 (August 1991); and USEPA CLP SOW ILM02.0, Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration, document number ILM02.0. The primary purpose of this section of the QAPjP is to define statistical acceptance criteria for chemical data generated by the analytical laboratory. These statistically based criteria are referred to in this document as Data Quality Objectives (DQOs) and are expressed in terms of precision, accuracy, completeness, representativeness and comparability.

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accuracy for routine analytical services that are covered under a SOW. The QC objective for the accuracy in terms of %D will be + or - 25 %D for soils and water matrices unless otherwise stated in EPA approved methodologies for services not covered under the USEPA CLP SOWs, including methods from Superfund Analytical Methods for Low Concentration Water for Organics Analysis, 6/91, volatiles analysis based on USEPA method 524.2 as adapted for contract Laboratory Program (CLP) use; USEPA CLP SOW OLM01.08 Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration, Document Number OLM01.8 including Revisions OLM01.1 (December 1990), OLM01.2 (January 1991), OLM01.3 (February 1991), OLM01.4 (March 1991), OLM01.5 (April 1991), OLM01.6 (June 1991), OLM01.7 (July 1991), and OLM01.8 (August 1991); and USEPA CLP SOW ILM02.0, Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration, document number ILM02.0. Percent recovery criteria, for reasons stated previously, is variable and the reader is referred to the laboratory Quality Assurance Plan (QAP) (Appendix B) for further elaboration on this aspect of accuracy.

Since true values for pH, specific conductance and temperature are not known for the particular matrices and specific sampling locations for the project, the accuracy of data produced by field instruments will be maintained and documented by performing initial calibrations followed by continuing calibration verifications and/or continuing calibrations with known standards and in accordance with manufacturer instructions which are provided in standard operating procedure format in the FSP.

3.4 COMPLETENESS

Completeness, as it pertains to the laboratory and for the purposes of this QAPjP, is defined as the ratio of the number of valid sample results to the total number of samples run with a specific analysis and/or on a specific matrix. In terms of sampling protocols,

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ensure that the sample does not become contaminated. Additionally, to verify that sampling and decontamination procedures are not introducing trace constituents of concern, three types of blanks will be taken and submitted to the analytical laboratory for analysis:

- 1) Field blanks will be prepared from source water used in decontamination and steam cleaning procedures. At a minimum, one field blank will be collected from each source of decontamination water utilized during decontamination procedures. All of these samples will be analyzed for parameters similar to those of the related samples collected using the device.
- 2) Equipment rinsate blanks will be collected by first passing a final analyte-free rinse water through the particular piece of precleaned equipment and subsequently collecting this water after it has touched the walls, screens and filters (if applicable) of the sample collection container. These samples will be analyzed for parameters similar to those of the related samples collected by the sampling device.
- 3) Trip blanks will accompany containers utilized for collection of samples to be analyzed for volatile organics. These samples consist of laboratory reagent water placed in volatile organic sample containers and sealed. These blanks will accompany any empty volatile organic container to and around the site during sampling activities and will also be submitted with every sample shipment to the laboratory that contains samples to be analyzed for volatile organics.

Other samples that will be collected during the field sampling program which will help provide more representative data are: 1) field duplicates which will be collected at a frequency of one per ten samples of a given matrix accordance with the USEPA's CLP SOWs, including methods from Superfund Analytical Methods for Low Concentration Water for Organics Analysis, 6/91, volatiles analysis based on USEPA method 524.2 as adapted for contract Laboratory Program (CLP) use; USEPA CLP SOW OLM01.08 Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration, Document Number OLM01.8 including Revisions OLM01.1 (December 1990), OLM01.2 (January 1991), OLM01.3 (February 1991), OLM01.4 (March 1991), OLM01.5 (April 1991), OLM01.6 (June 1991),

OLM01.7 (July 1991), and OLM01.8 (August 1991); and USEPA CLP SOW ILM02.0, Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration, document number ILM02.0 for routine analytical services; and 2) split samples collected by the oversight contractor; and 3) matrix spikes and matrix spike duplicates which will be analyzed by the laboratory for each group of twenty samples or less of a given matrix type to ensure method precision and accuracy.

3.6 COMPARABILITY

Comparability, as used within this QAPjP, is understood as being the confidence with which one data set can be compared to another. Since previous environmental investigations have been performed at the Limestone Road site, a substantial data base of chemical data exists. To ensure data set comparability, the following steps will be taken:

- 1) Maps showing locations of previous sampling stations will be obtained, reviewed and made consistent with the proposed sampling event(s);
- 2) Former suites of chemical parameters will be analyzed and current analyses performed with similar or improved methods having detection limits at or below previous analyses;
- 4) Techniques utilized to collect previous samples will be utilized when possible;
- 5) Reporting units from previous chemical data bases will be reviewed and used to formulate current sample concentration units; and
- 6) The level of QA/QC will be compared to previous sampling events and designed to be, at a minimum, consistent with previous sampling and analysis activities.

in the USEPA's CLP SOWs for routine analytical services, including methods from Superfund Analytical Methods for Low Concentration Water for Organics Analysis, 6/91, volatiles analysis based on USEPA method 524.2 as adapted for contract Laboratory Program (CLP) use; USEPA CLP SOW OLM01.08 Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration, Document Number OLM01.8 including Revisions OLM01.1 (December 1990), OLM01.2 (January 1991), OLM01.3 (February 1991), OLM01.4 (March 1991), OLM01.5 (April 1991), OLM01.6 (June 1991), OLM01.7 (July 1991), and OLM01.8 (August 1991); and USEPA CLP SOW ILM02.0, Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration, document number ILM02.0. Notwithstanding the former, all calibration procedures for special analytical services, will be in accordance with the calibration requirements specified by USEPA approved protocols utilized during this project.

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7.0 ANALYTICAL PROCEDURES

7.1 GENERAL

The analytical program for the Limestone Road site SRI/FS has been developed based on the results from previous sampling events performed at the site. Where possible, all methodologies are consistent with the USEPA's CLP SOWs, including methods from Superfund Analytical Methods for Low Concentration Water for Organics Analysis, 6/91, volatiles analysis based on USEPA method 524.2 as adapted for contract Laboratory Program (CLP) use; USEPA CLP SOW OLM01.08 Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration, Document Number OLM01.8 including Revisions OLM01.1 (December 1990), OLM01.2 (January 1991), OLM01.3 (February 1991), OLM01.4 (March 1991), OLM01.5 (April 1991), OLM01.6 (June 1991), OLM01.7 (July 1991), and OLM01.8 (August 1991); and USEPA CLP SOW ILM02.0, Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration, document number ILM02.0. Other methodologies for special analytical services are in accordance with EPA approved methodologies. Field reconnaissance methodologies have been based at least in part on USEPA documents including "A Compendium of Superfund Field Methodologies". Specific details concerning sampling procedures are provided in the FSP under a different cover.

7.2 PARAMETERS, SAMPLE MATRIX, AND SAMPLE QUANTITY

Provided in Table 1 is a summary of the specific number of samples and their respective matrices that will be collected during the SRI/FS at the Limestone Road site. Also included in the table is a general list of parameters consistent with those presented in the previously presented and approved Work Plan with the addition of six general indicator parameters (carbonate, fluoride, nitrite, total kjeldahl nitrogen, total phosphorus and silica) which will facilitate understanding of possible different ground water types at the site. The numbers of

QA/QC samples presented in the table have been calculated under the assumption that all proposed samples can and will be collected.

7.3 LABORATORY ANALYTICAL METHODOLOGIES

Provided in Table 4 are analytical methodologies that will be utilized by the laboratory for analysis of environmental samples collected in conjunction with the Limestone Road site SRI/FS. As evidenced in the table, the majority of analyses will be performed in accordance with the USEPA's CLP as stated in the methods from Superfund Analytical Methods for Low Concentration Water for Organics Analysis, 6/91, volatiles analysis based on USEPA method 524.2 as adapted for contract Laboratory Program (CLP) use; USEPA CLP SOW OLM01.08 Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration, Document Number OLM01.8 including Revisions OLM01.1 (December 1990), OLM01.2 (January 1991), OLM01.3 (February 1991), OLM01.4 (March 1991), OLM01.5 (April 1991), OLM01.6 (June 1991), OLM01.7 (July 1991), and OLM01.8 (August 1991); and USEPA CLP SOW ILM02.0, Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration, document number ILM02.0. However, some analyses are not covered under the CLP and therefore approved USEPA methodologies have been listed.

Accompanying each methodology are detection limits for water and soil matrices that are routinely achievable when no interferences are present. It is expected that due to the complexity of environmental samples that these detection limits will vary from one sample to another.

Specific lists of analytes of interest for multi-component analyses (volatile organics, base/neutral-acid extractables, organochlorine pesticides/PCBs and TAL metals) are presented respectively in Tables 5 through 8. All samples for volatiles, semivolatiles, and pesticide/PCB compound analyses will be analyzed for the USEPA CLP TCL compounds, USEPA CLP SOW OLM01.08 Statement of Work for Organics Analysis, Multi-Media, Multi-

Concentration, Document Number OLM01.8 including Revisions OLM01.1 (December 1990), OLM01.2 (January 1991), OLM01.3 (February 1991), OLM01.4 (March 1991), OLM01.5 (April 1991), OLM01.6 (June 1991), OLM01.7 (July 1991), and OLM01.8 (August 1991); regardless of the method by which the samples are run. This practice will standardize the parameters being determined for each method, provide a basis for comparison of analytical data, and assure that no analytes are excluded from analysis due to differences in the methods of analysis employed. Specifically, water samples analyzed for volatile organic compounds by method 524.2 will be analyzed for the USEPA CLP TCL volatile compounds, as stated in USEPA CLP SOW OLM01.08 Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration, Document Number OLM01.8 including Revisions OLM01.1 (December 1990), OLM01.2 (January 1991), OLM01.3 (February 1991), OLM01.4 (March 1991), OLM01.5 (April 1991), OLM01.6 (June 1991), OLM01.7 (July 1991), and OLM01.8 (August 1991).

7.4 FIELD METHODOLOGIES

Field parameters (pH, specific conductance, temperature, and headspace volatile organics) will be measured according to specific instrument manufacturers instructions. The USEPA document, EPA/540/P-87/001, entitled "A Compendium of Superfund Field Operations Methods" will be used as a reference. Specific details concerning SOPs that will be used are provided in the FSP.

8.0 DATA REDUCTION, VALIDATION AND REPORTING

8.1 GENERAL

Data reduction, validation and reporting procedures include an evaluation of both the field data package and the laboratory analytical data package. The overall DQOs for this SRI/FS can only be met if data generated in the field and by the analytical laboratory can be proven to be valid. The following discussions provide the basis for data reduction, review, validation and reporting.

8.2 DATA REDUCTION

Wadsworth/ALERT Laboratories utilize a Laboratory Computerized Data Management System (LCDMS) to record, document, and assimilate pertinent laboratory technical and administrative data. This LCDMS provides data management functions for a number of component laboratory activities including: laboratory sample acceptance, sample analytical results, sample status and tracking, analytical QA/QC, final report generation, and client Invoicing. The data management system enhances efficient coordination among these component laboratory activities by providing a highly automated, standardized communication network for data transfer and correlation. The reader is referred to the laboratory QAP (Appendix B) and/or EPA CLP SOW(s), including methods from Superfund Analytical Methods for Low Concentration Water for Organics Analysis, 6/91, volatiles analysis based on USEPA method 524.2 as adapted for contract Laboratory Program (CLP) use; USEPA CLP SOW OLM01.08 Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration, Document Number OLM01.8 including Revisions OLM01.1 (December 1990), OLM01.2 (January 1991), OLM01.3 (February 1991), OLM01.4 (March 1991), OLM01.5 (April 1991), OLM01.6 (June 1991), OLM01.7 (July 1991), and OLM01.8 (August 1991); and USEPA CLP SOW ILM02.0, Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration, document number ILM02.0, for details concerning equations/procedures used

- Field replicates will be reviewed to check the precision of chemical analyses and field sample collection techniques. If available, field replicates and laboratory duplicates for water matrices will be reviewed.
- Surrogate spikes must be within allowable control limits specified for the method
- Matrix spike recoveries for organic analyses are considered advisory by the USEPA and will be used to evaluate the presence of matrix interferences that may be affecting recovery of a particular analyte. Control limits must be reported when matrix spike data is reported. When matrix spike duplicates are performed and/or reported, the RPD must be calculated and control limits reported
- Matrix spike recoveries for inorganic analyses are definitive. If matrix spike recoveries are outside control limits, the data must be flagged as a quantitatively suspect or estimated value.

8.5 DATA REPORTING

A general flow and reporting scheme from collection of raw data through storage is included as Figure 12. Details concerning laboratory reporting requirements are specified in the appropriate USEPA CLP SOWs, including methods from Superfund Analytical Methods for Low Concentration Water for Organics Analysis, 6/91, volatiles analysis based on USEPA method 524.2 as adapted for contract Laboratory Program (CLP) use; USEPA CLP SOW OLM01.08 Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration, Document Number OLM01.8 including Revisions OLM01.1 (December 1990), OLM01.2 (January 1991), OLM01.3 (February 1991), OLM01.4 (March 1991), OLM01.5 (April 1991), OLM01.6 (June 1991), OLM01.7 (July 1991), and OLM01.8 (August 1991); and USEPA CLP SOW ILM02.0, Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration, document number ILM02.0. Special analytical services will be reported in accordance with requirements provided in Appendix D. These requirements will provide abundant information concerning overall analytical quality assurance and will allow for validation checks on laboratory generated data.

12.0 SPECIFIC ROUTINE PROCEDURES USED TO ASSESS DATA **(PRECISION, ACCURACY, AND COMPLETENESS)**

12.1 GENERAL

Details concerning the evaluation of data precision, accuracy, and completeness are described in the following sections. The presented information is to be used as a guideline in the overall evaluation of field and laboratory data.

12.2 PRECISION

Precision is defined as an estimate of the reproducibility of a method and/or collection procedure, and is estimated by several statistical tests: the standard deviation of the error distribution, the coefficient of variation (CV) and the relative percent difference (RPD) between replicate (duplicate) samples. Information regarding the precision of chosen sample collection methodologies and analytical methods will be ascertained by collecting field replicates and performing laboratory duplicates. Additional information concerning laboratory precision will be obtained from matrix spike duplicates and continuing calibration verifications. If sufficient replicate and/or duplicate data are collected, the arithmetic mean and standard deviation can be determined.

Precision can also be defined by the CV, which expresses the standard deviation as a percentage of the mean. Specific statistical comparison of replicate (duplicate) data from field and laboratory measurements, as a means of evaluating precision of both sample collection procedures and laboratory performance, may be accomplished by first comparing the obtained replicate (duplicate) results with the published USEPA CLP criteria as stated in the methods from Superfund Analytical Methods for Low Concentration Water for Organics Analysis, 6/91, volatiles analysis based on USEPA method 524.2 as adapted for contract Laboratory Program (CLP) use; USEPA CLP SOW OLM01.08 Statement of Work for Organics Analysis, Multi-

Media, Multi-Concentration, Document Number OLM01.8 including Revisions OLM01.1 (December 1990), OLM01.2 (January 1991), OLM01.3 (February 1991), OLM01.4 (March 1991), OLM01.5 (April 1991), OLM01.6 (June 1991), OLM01.7 (July 1991), and OLM01.8 (August 1991); and USEPA CLP SOW ILM02.0, Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration, document number ILM02.0 for method precision. If not available for a given method, the RPD may be calculated and compared to the laboratory precision criteria found in the laboratory's QAP (Appendix B). This calculated precision value may then be compared with the stated precision DQO for the analyte in question to determine whether the DQO has been satisfied.

12.3 ACCURACY

The accuracy of a method is an estimate of the difference between the true value and the determined mean value. Certain QA parameters such as laboratory control samples, reagent water spike samples, QC check samples, matrix spikes and surrogate spike samples all have known concentration in them prior to analysis. By comparing the percent recovery results to the known true value, it is possible to measure the accuracy of the analysis. In routine practice, the laboratory will collect the data for each of these parameters for a period of at least 30 measurements. The results of these 30 measurements will be will then be used to calculate a mean value. Then, based on the desired level of confidence, two or three standard deviation ranges will be established as practical control limits. To be valid, these control limits must meet the accuracy limits specified in the appropriate USEPA method for each analyte measured. If the determined control limits are within the range established for the analyte and method by the USEPA then the determined range becomes the practical control limit used by the laboratory until another set of data is developed and new control limits are calculated.

Table 1
LIMESTONE ROAD SRI/FS
NUMBER OF SAMPLES, ANALYTICAL PARAMETERS, AND MATRICES

ANALYTE(S)	ANALYTICAL MATRIX						
	GROUND WATER	SURFACE WATER	STREAM SEDIMENTS	SURFACE SOILS CAP AREA	SURFACE SOILS OIL RECOVERY	SOIL BORINGS	PULVERIZED BEDROCK
PARAMETERS:							
pH	Field	Field	9	40	--	6	3
Specific Conductance	Field	Field	--	--	--	--	--
Temperature	Field	Field	--	--	--	--	--
ORGANICS:							
Volatile Organics (TCL)	42 @	--	--	--	2	6	--
BNA Extractables (TCL)	--	--	--	--	2	--	--
Pesticides/PCBs (TCL)	--	--	--	--	2	--	--
INDICATORS:							
Alkalinity, bicarbonate	42 @	18	--	--	--	--	--
Alkalinity, carbonate	42 @	18	--	--	--	--	--
Chloride	42 @	18	--	--	--	--	--
Cyanide	42 @	18	9	--	2	6	3
Fluoride	42 @	18	--	--	--	--	--
Nitrogen, Ammonia	42 @	18	--	--	--	--	--
Nitrogen, Nitrate	42 @	18	--	--	--	--	--
Nitrogen, Nitrite	42 @	18	--	--	--	--	--
Nitrogen, Total Kjeldahl	42 @	18	--	--	--	--	--
Phosphorus, Total	42 @	18	--	--	--	--	--
Silica	42 @	18	--	--	--	--	--
Sulfate	42 @	18	--	--	--	--	--
METALS:							
TAL-- Metals	--	--	--	--	2	--	--
Arsenic	42 @	18	9	--	--	6*	3*
Barium	42 @	18	9	--	--	6*	3*
Cadmium	42 @	18	9	40*	--	6*	3*
Calcium	42 @	18	9	--	--	6	3
Chromium	42 @	18	9	40*	--	6*	3*
Chromium, Hexavalent	42 @	18	9	--	--	6	3
Copper	42 @	18	9	--	--	6	3
Iron	42 @	18	9	--	--	6	3
Lead	42 @	18	9	40*	--	6*	3*
Magnesium	42 @	18	9	--	--	6	3
Manganese	42 @	18	9	--	--	6	3
Nickel	42 @	18	9	--	--	6*	3*
Potassium	42 @	18	9	--	--	6	3
Selenium	42 @	18	9	--	--	6*	3*
Sodium	42 @	18	9	--	--	6	3
Zinc	42 @	18	9	--	--	6*	3*
QA/QC SAMPLES:							
Duplicate	5 @	2	1	4	1	1	1
Rinsate Blanks	4 @	2	2	3	2	2	2
Filter Blanks	3 @	1					
Field Blanks	1/Source	1/Source	1/Source	1 Source	1/Source	1/Source	1/Source
Trip Blanks	1/Cooler	--	--	--	1/Cooler	1/Cooler	--
GEOTECHNICAL:							
Atterberg Limits	--	--	--	#	--	--	--
Moisture Content	--	--	--	#	--	--	--
Undrained Triaxial--							
Compression Test	--	--	--	#	--	--	--
Permeability	--	--	--	#	--	--	--
Partical Size Analysis	--	--	--	#	--	--	--
Unit Weight	--	--	--	#	--	--	--

-- -- Analysis will not be performed

Metals analyses will be performed on Total Digestion extracts unless otherwise indicated

* -- Metals analyses to be performed on TCLP and Total Digestion extracts; for surface soils, only 10--20 percent using TCLP

-- The number of samples collected will be based on the depth of fill material

@ 4 proposed sampling locations (see section 5.11 of the FSP)

@ -- Number is based on sampling all existing monitor wells twice. Final number will include new monitor wells and selected residential wells.

TAB1--DEC.WK1/LIMESTONE DEC--91

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TABLE 2. LIMESTONE ROAD SRI/FS CONTAINERS, PRESERVATION TECHNIQUES AND HOLDING TIMES

Matrix: Water

PARAMETERS	CONTAINER	PRESERVATION	HOLDING TIME	VOLUME
Organics:				
Volatile Organics	Glass w/ teflon septums	HCl to pH<2	14 days	40ml
Neutral-Acid Extractables	Amber glass	Cool to 4°C	7 days (extraction); 40 days (analysis)	1L
Pesticides/PCBs	Amber glass	Cool to 4°C	7 days (extraction); 40 days (analysis)	1L
Metals:				
CLP Target Metals	Plastic	HNO ₃ to pH<2	Mercury 26 days to extraction All metals: 6 months for analysis	1L
Inorganic Indicators: Cyanide	Glass	NaOH to pH>12	14 days	500ml
Group 1: Hexavalent Chromium, Sulfate, Nitrate, Nitrite	Glass	Cool to 4°C	24 hours/28 days/48 hrs/48 hrs.	1L
Group 2: Alkalinity, Chloride, Fluoride	Glass	Cool to 4°C	14 days/28 days/28 days	1L
Group 3: Ammonia, TKN, Phosphate	Glass	H ₂ SO ₄ to pH<2	All 28 Days	1L

Matrix: Soil

PARAMETERS	CONTAINER	PRESERVATION	HOLDING TIME	VOLUME
Volatile Organics	Glass/teflon septum	Cool to 4°C	7 Days	40 ml
All other chemical parameters	Glass	Cool to 4°C	See Water holding times	16 oz.
Geotechnical samples	Shelby Tube	None; seal with wax	28 days	2' x 3"

Table 3
LIMESTONE ROAD SRI/FS
SAMPLE IDENTIFICATION SYSTEM

Sample Type	Descriptor	Specifier	Interval	Example
New Monitor Wells (ground water)	GMMW	Location Number	NA	GMMW-7
Surface Water	SW	Location Number	NA	SW-3
Surface Sediment	SD	Location Number	0-24"	SD-2(0-12")
Surface Fill	SF	Location Number	0-24"	SF-4(6-12")
Soil Borings	SB	Location Number	0-50"	SB-1(36-42")
Oil Recovery Area (soils)	ORSF	Location Number	0-24"	ORSF-3(0-6")
Bedrock	BR	Location Number	50-150"	BR-2(75-80")

TAB3-DEC.WKI/LIMESTONE DEC-91

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Table 4.

LIMESTONE ROAD SRI/FS
SUMMARY OF METHODS AND DETECTION LIMITS FOR CHEMICAL ANALYSES

CHEMICAL ANALYSES	METHOD(S)	DETECTION LIMITS (Water Matrices)	DETECTION LIMITS (Soil Matrices)
FIELD PARAMETERS:			
pH (soil)	SW-846 9040	0.1 units	0.1 units
pH (water)	EPA 150.1	0.1 units	0.1 units
Specific Conductance	EPA 120.1	0.1 umhos/cm	NA
Temperature	EPA 170.1	0.1 degrees C	NA
ORGANICS:			
Volatile Organics (water)	EPA 524.2-CLP-M ^a	See Table 5	NA
Volatile Organics (soil)	OLM01.8 ^b	NA	See Table 5
Base/Neutral-Acid Extractables (soil)	OLM01.8 ^b	See Table 6	See Table 6
Organochlorine Pest./PCBs	OLM01.8 ^b	See Table 7	See Table 7
METALS:			
TAL-Metals	SOW ILM02.0 ^c	See Table 8	See Table 8
Arsenic	SOW ILM02.0 ^c	0.005 mg/L	0.5 mg/Kg
Barium	SOW ILM02.0 ^c	0.01 mg/L	0.5 mg/Kg
Cadmium	SOW ILM02.0 ^c	0.01 mg/L	0.5 mg/Kg
Calcium	SOW ILM02.0 ^c	0.01 mg/L	0.5 mg/Kg
Chromium	SOW ILM02.0 ^c	0.02 mg/L	1 mg/Kg
Chromium, hexavalent	SW-846 7196-CLP-M	0.02 mg/L	1 mg/Kg
Copper	SOW ILM02.0 ^c	0.01 mg/L	0.5 mg/Kg
Iron	SOW ILM02.0 ^c	0.05 mg/L	2.5 mg/Kg
Lead	SOW ILM02.0 ^c	0.003 mg/L	0.15 mg/Kg
Magnesium	SOW ILM02.0 ^c	0.01 mg/L	0.5 mg/Kg
Manganese	SOW ILM02.0 ^c	0.01 mg/L	0.5 mg/Kg
Nickel	SOW ILM02.0 ^c	0.04 mg/L	2 mg/Kg
Potassium	SOW ILM02.0 ^c	1 mg/L	50 mg/Kg
Selenium	SOW ILM02.0 ^c	0.005 mg/L	0.5 mg/Kg
Sodium	SOW ILM02.0 ^c	0.1 mg/L	5 mg/Kg
Zinc	SOW ILM02.0 ^c	0.01 mg/L	0.5 mg/Kg
INDICATORS:			
Alkalinity, bicarbonate	Calculate	20 mg/L	NA
Alkalinity, carbonate	EPA 310.1-CLP-M	20 mg/L	NA
Chloride	SW-846 9250-CLP-M	2 mg/L	NA
Cyanide	SW-846 9010-CLP-M	0.005 mg/L	0.5 mg/Kg
Fluoride	EPA 340.2-CLP-M	0.1 mg/L	NA
Nitrogen, Ammonia	EPA 350.2-CLP-M	0.2 mg/L	NA
Nitrogen, Nitrate	EPA 353.3-CLP-M	0.1 mg/L	NA
Nitrogen, Nitrite	EPA 353.3-CLP-M	0.04 mg/L	NA
Nitrogen, Total Kjeldahl	SW-846 9200-CLP-M	0.3 mg/L	NA
Phosphorus, Total	EPA 365.2-CLP-M	0.1 mg/L	NA
Silica	SW-846 6010-CLP-M	1 mg/L	NA
Sulfate	EPA 375.4-CLP-M	5 mg/L	NA
GEOTECHNICAL:			
Atterberg Limits	ASTM D-4318	NA	Not Established
Moisture Content	ASTM D-2216	NA	Not Established
Undrained Triaxial Compression Test	ASTM D-4767	NA	Not Established
Permeability	ASTM D-2434	NA	Not Established
Particle Size Analysis	ASTM D-422	NA	Not Established
Unit Weight	ASTM D-1557	NA	Not Established

Table 4.

LIMESTONE ROAD SRI/FS
SUMMARY OF METHODS AND DETECTION LIMITS FOR CHEMICAL ANALYSES
REFERENCE

^aSuperfund Analytical Methods for Low Concentration Water for Organics Analysis, 6/91, volatiles analysis based on USEPA Method 524.2 as Adapted for Contract Laboratory Programs (CLP) use.

^bUSEPA CLP SOW OLM01.08 Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration, Document Number OLM01.8 Including Revisions OLM01.1 (December 1990), OLM01.2 (January 1991), OLM01.3 (February 1991), OLM01.4 (March 1991), OLM01.5 (April 1991), OLM01.6 (June 1991), OLM01.7 (July 1991), and OLM01.8 (August 1991).

^cUSEPA CLP SOW ILM02.0, Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration, Document Number ILM02.0.

NA Not Applicable

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Table 5
TARGET COMPOUND LIST (TCL) VOLATILE
COMPOUNDS AND QUANTITATION LIMITS

Elements	Quantitation Limits	
	OLM01.8 ^{abc} Low soil/sediment (ug/kg)	Method 524.2 ^d Drinking Water (ug/L)
Chloromethane	10	1
Bromomethane	10	1
Vinyl chloride	10	1
Chloroethane	10	1
Methylene chloride	10	2
Acetone	10	5
Carbon disulfide	10	1
1,1-Dichloroethene	10	1
1,1-Dichloroethane	10	1
1,2-Dichloroethene (cis and trans)	10	1
Chloroform	10	1
1,2-Dichloroethane	10	1
2-Butanone	10	5
1,1,1-Trichloroethane	10	1
Carbon tetrachloride	10	1
Bromodichloromethane	10	1
1,1,2,2-Tetrachloroethane	10	1
1,2-Dichloropropane	10	1
trans-1,3-Dichloropropene	10	1
Trichloroethene	10	1
Dibromochloromethane	10	1
1,1,2-Trichloroethane	10	1
Benzene	10	1
cis-1,3-Dichloropropene	10	1
Bromoform	10	1
2-Hexanone	10	5
4-Methyl-2-pentanone	10	5
Tetrachloroethene	10	1
Toluene	10	1
Chlorobenzene	10	1
Ethyl benzene	10	1
Styrene	10	1
Total xylenes	10	1

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Table 5.
TARGET COMPOUND LIST (TCL) VOLATILE
COMPOUNDS AND QUANTITATION LIMITS

^aUSEPA CLP SOW OLM01.08 Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration, document Number OLM01.8 Including Revisions OLM01.1 (December 1990), OLM01.2 (January 1991), OLM01.3 (February 1991), OLM01.4 (March 1991), OLM01.5 (April 1991) OLM01.6 (June 1991), OLM01.7 (July 1991), and OLM01.8 (August 1991).

^bQuantitation limits listed for soil/sediment are based on wet weight. The quantitation limits calculated for soil/sediment calculated on dry weight basis will be higher.

^cMedium soil/sediment quantitation limits for volatile TCL compounds are 100 times the individual low soil/sediment quantitation limits.

^dSuperfund Analytical Methods for Low Concentration Water for Organics Analysis, 6/91, volatiles analysis based on USEPA Method 524.2 as adapted for Contract Laboratory Program (CLP) use.

/Note: Specific quantitation limits are highly matrix dependent. The quantitation limits listed herein are provided for guidance and may not always be achievable.

All volatile organic compound analyses will be performed to determine the USEPA TCL compounds, regardless of the compound list stated in the reference source for method 524.2

AR302483

Table 6

**TARGET COMPOUND LIST (TCL) VOLATILE
COMPOUNDS AND QUATITATION LIMITS**

Semivolatiles	CAS Number	Quatitation Limits ^{a b}	
		Low water ^c (ug/L)	Low soil/sediment ^d (ug/kg)
Phenol	108-95-2	10	330
Bis(2-chloroethyl) ether	111-44-4	10	330
2-Chlorophenol	95-57-8	10	330
1,3-Dichlorobenzene	541-73-1	10	330
1,4-Dichlorobenzene	106-46-7	10	330
1,2-Dichlorobenzene	95-50-1	10	330
2-Methylphenol	95-48-7	10	330
2,2'-Oxybis (1-Chloropropane)*	39638-32-9	10	330
4-Methylphenol	106-44-5	10	330
N-Nitroso-di-n-propylamine	621-64-7	10	330
Hexachloroethane	67-72-1	10	330
Nitrobenzene	98-95-3	10	330
Isophorone	78-59-1	10	330
2-Nitrophenol	88-75-5	10	330
2,4-Dimethylphenol	105-67-9	10	330
Bis(2-chloroethoxy) methane	111-91-1	10	330
2,4-Dichlorophenol	120-83-2	10	330
1,2,4-Trichlorobenzene	120-82-1	10	330
Naphthalene	91-20-3	10	330
4-Chloroaniline	106-47-8	10	330
Hexachlorobutadiene	87-68-3	10	330
4-Chloro-3-methylphenol (para-chloro-meta-cresol)	59-50-7	10	330
2-Methylnaphthalene	91-57-6	10	330
Hexachlorocyclopentadiene	77-47-4	10	330
2,4,6-Trichlorophenol	88-06-2	10	330
2,4,5-Trichlorophenol	95-95-4	25	800

* Formerly called bis(2-Chloroisopropyl) ether

Table 6 (cont.)

TARGET COMPOUND LIST (TCL) VOLATILE
COMPOUNDS AND QUATITATION LIMITS

Semivolatiles	CAS Number	Quatitation Limits ^{a b}	
		Low water ^c (ug/L)	Low soil/sediment ^d (ug/kg)
Chrysene	218-01-9	10	330
Di-n-octyl phthalate	117-84-0	10	330
Benzo(b)fluoranthene	205-99-2	10	330
Benzo(k)fluoranthene	207-08-9	10	330
Benzo(a)pyrene	50-32-8	10	330
Indeno(1,2,3-cd)pyrene	193-39-5	10	330
Dibenzo(a,h)anthracene	53-70-3	10	330
Benzo(g,h,i)perylene	191-24-2	10	330

^aQuantitation limits listed for soil/sediment are based on wet weight.
The quantitation limits calculated for soil/sediment calculated on dry weight basis will be higher.

^bUSEPA CLP SOW OLM01.08 Statement of Work for Organics Analysis, Multi-Media, Multi-Concentration, Document Number OLM01.8 Including Revisions OLM01.1 (December 1990), OLM01.2 (January 1991), OLM01.7 (July 1991), and OLM01.8 (August 1991).

^cMedium water quantitation limits for volatile TCL compounds are 100 times the individual low water quantitation limit.

^dMedium soil/sediment quantitation limits for volatile TCL compounds are 60 times the individual low soil/sediment quantitation limits.

Note: Specific quantitation limits are highly matrix dependent.
The quantitation limits listed herein are provided for guidance and may not always be achievable.

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Table 6 (cont.)

**TARGET COMPOUND LIST (TCL) VOLATILE
COMPOUNDS AND QUATITATION LIMITS**

Semivolatiles	CAS Number	Quatitation Limits ^{a b}	
		Low water ^c (ug/L)	Low soil/sediment ^d (ug/kg)
2-Chloronaphthalene	91-58-7	10	330
2-Nitroaniline	88-74-4	25	800
Dimethylphthalate	131-11-3	10	330
Acenaphthylene	208-96-8	10	330
3-Nitroaniline	99-09-2	25	800
Acenaphthene	83-32-9	10	330
2,4-Dinitrophenol	51-28-5	25	800
4-Nitrophenol	100-02-7	25	800
Dibenzofuran	132-64-9	10	330
2,4-Dinitrotoluene	121-14-2	10	330
2,6-Dinitrotoluene	606-20-2	10	330
Diethylphthalate	84-66-2	10	330
4-Chlorophenyl phenyl ether	7005-72-3	10	330
Fluorene	86-73-7	10	330
4-Nitroaniline	100-01-6	25	800
4,6-Dinitro-2-methylphenol	534-52-1	25	800
N-nitrosodiphenylamine	86-30-6	10	330
4-Bromophenyl phenyl ether	101-55-3	10	330
Hexachlorobenzene	118-74-1	10	330
Pentachlorophenol	87-86-5	25	800
Phenanthrene	85-01-8	10	330
Anthracene	120-12-7	10	330
Carbazole	86-74-8	10	330
Di-n-butylphthalate	84-74-2	10	330
Fluoranthene	206-44-0	10	330
Pyrene	129-00-0	10	330
Butyl benzyl phthalate	85-68-7	10	330
3,3'-Dichlorobenzidine	91-94-1	10	330
Benzo(a)anthracene	56-55-3	10	330
Bis(2-ethylhexyl)phthalate	117-81-7	10	330

TAB6-1.WKL/FAIRCHILD F5

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Table 7

TARGET COMPOUND LIST (TCL)
PESTICIDES, PBCs, AND QUANTITATION LIMITS

Semivolatiles	CAS Number	Quantitation Limits ^{a b}	
		Low water ^c (ug/L)	Low soil/sediment ^d (ug/kg)
alpha-BHC	319-84-6	0.05	1.7
beta-BHC	319-85-7	0.05	1.7
delta-BHC	319-86-8	0.05	1.7
gamma-BHC (Lindane)	58-89-9	0.05	1.7
Heptachlor	76-44-8	0.05	1.7
Aldrin	309-44-8	0.05	1.7
Heptachlor epoxide	1024-57-3	0.05	1.7
Endosulfan I	959-98-8	0.05	1.7
Dieldrin	60-57-1	0.10	3.3
4,4'-DDE	72-55-9	0.10	3.3
Endrin	72-20-8	0.10	3.3
Endosulfan II	33213-65-9	0.10	3.3
4,4'-DDD	72-54-8	0.10	3.3
Endrin aldehyde	7421-93-4	0.10	3.3
Endosulfan sulfate	1031-07-8	0.10	3.3
4,4'-DDT	50-29-3	0.10	3.3
Endrin ketone	53494-70-5	0.10	3.3
Methoxychlor	72-43-5	0.50	17.0
alpha-Chloradane	5102-71-9	0.05	1.7
gamma Chlordane	5103-74-2	0.05	1.7
Toxaphene	8001-35-2	5.0	170.0
Aroclor-1016	12674-11-2	1.0	33.0
Aroclor-1221	11104-28-2	2.0	67.0
Aroclor-1232	11141-16-5	1.0	33.0
Aroclor-1242	53469-16-5	1.0	33.0
Aroclor-1248	12672-29-6	1.0	33.0
Aroclor-1254	11097-69-1	1.0	33.0
Aroclor-1260	11096-82-5	1.0	33.0

^aQuantitation limits listed for soil/sediment are based on wet weight.
The quantitation limits calculated for soil/sediment calculated on dry weight basis will be higher.

^bUSEPA CLP SOW ILM02.0, Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration, Document Number ILM02.0.

^cMedium water quantitation limits for volatile TCL compounds are 100 times the individual low water quantitation limits.

^dMedium soil/sediment quantitation limits for volatile TCL compounds are 60 times the individual low soil/sediment quantitation limits.

Note: Specific Quantitation limits are highly matrix dependent.
The quantitation limits listed herein are provided for guidance and may not always be achievable.

TABLE 8.
TARGET ANALYTE LIST (TAL) INORGANICS
AND QUANTITATION LIMITS*

Elements	Quantitation Limits Low soil/sediment (mg/kg)	Analytical Method*
Aluminum	5	ILM02.0
Antimony	10	ILM02.0
Arsenic	0.5	ILM02.0
Barium	0.5	ILM02.0
Beryllium	0.25	ILM02.0
Cadmium	0.5	ILM02.0
Calcium	0.5	ILM02.0
Chromium	1	ILM02.0
Cobalt	2.5	ILM02.0
Copper	0.5	ILM02.0
Iron	2.5	ILM02.0
Lead	1.5	ILM02.0
Magnesium	0.5	ILM02.0
Manganese	0.5	ILM02.0
Mercury	0.1	ILM02.0
Nickel	2	ILM02.0
Potassium	50	ILM02.0
Selenium	0.5	ILM02.0
Silver	0.5	ILM02.0
Sodium	5	ILM02.0
Thallium	0.5	ILM02.0
Vanadium	2.5	ILM02.0
Zinc	0.5	ILM02.0
Cyanide	0.5	ILM02.0

* Specific detection limits are highly matrix dependent. The detection limits listed herein are provided for guidance and may not always be achievable.

*USEPA CLP SOW ILM02.0, Statement of Work for Inorganics Analysis, Multi-Media, Multi-Concentration, document Number ILM02.0.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Region III

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Mr. Jeffery P. Sgambat, C.P.G.
Project Coordinator
Geraghty & Miller, Inc.
Environmental Services
180 Admiral Cochrane Drive
Suite 300
Annapolis, Maryland 21401

JAN 17 1992.

Re: Sixth review of the draft Field Sampling Plan (FSP) and the
Quality Assurance Project Plan (QAPjP) for the
Limestone Road Superfund Site

Dear Mr. Sgambat:

The Environmental Protection Agency (EPA) has completed the sixth and final review of the "revised pages" from the draft Field Sampling Plan (FSP) and the Quality Assurance Project Plan (QAPjP) for the Supplemental Remedial Investigation/Feasibility Study (SRI/FS) at the Limestone Road Superfund site. In an effort to expedite the interim remedial action called for in the Record of Decision (ROD) and despite EPA's reservations, EPA approves both the FSP and QAPjP. Additionally, there are several mistakes that need to be corrected. Enclosed is a page that lists the required corrections.

EPA has approved the FSP and QAPjP. EPA has reservations because we believe that all ground water samples from monitoring wells need to be analyzed at lower detection limits than those proposed in the FSP and QAPjP. EPA has explained to the potentially responsible parties (PRPs) that the lower detection limits are required for the risk assessment. However, the PRPs have declined to conduct the analysis as requested. Therefore, EPA will make arrangements to have samples analyzed in accordance with the data quality objectives at the lower detection limits. EPA and/or its representatives will perform these sampling activities during oversight of the PRPs activities wherever possible.

EPA has the obligation and responsibility to ensure that human health and the environment are protected. EPA must function within the mandates of The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), Superfund Amendments and Reauthorization Act of 1986 (SARA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). To adhere to these requirements, EPA will conduct

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analyses at detection limits which are different than those proposed by the PRPs. The PRPs' unwillingness to agree to conduct sampling and analysis as required has been clearly documented. The PRPs have a responsibility to support EPA in its effort in accordance with Sections XI and XVI of the Partial Consent Decree. Accordingly, EPA requests that we and/or our representatives be provided the opportunity to collect splits from all samples collected by the PRPs' and/or your contractor(s).

Apparently the PRPs have a misconception concerning certain aspects of the first RI/FS and the ROD which was issued for this site. The PRPs apparently believe that because the first RI/FS included a risk assessment, the lower detection limits are not required. They also apparently believe that the contaminants of concern for ground water were finalized in the ROD. Neither is true. The first RI/FS and risk assessment were inconclusive with respect to ground water contamination. Hence, the ROD recommended and adopted an interim remedial action. The selected interim remedial action requires that the contaminated soil be capped, and that a supplemental ground water study be conducted. The scope of the supplemental ground water investigation and the associated risk assessment cannot be limited to only those contaminants which may have been identified during the previous RI/FS. EPA does not believe that the risks associated with exposure to contaminated ground water can be properly characterized by only looking at a limited number of contaminants. According to the ROD on page 4, inorganics were of primary interest. The distribution of organic compounds was sporadic and less consistent in their distribution than inorganic compounds in ground water. Despite the fact that no observable trend could be identified which correlates the occurrence of organic compounds in ground water with the landfill areas, the possibility exists given the nature of flow in fractured media. Additionally, EPA requires that all inorganic or metal analysis for residential well samples be analyzed for total or non-filtered metals for the risk assessment. Therefore, EPA will analyze all of its residential well samples in accordance with this requirement.

Now that the FSP and QAPjP are approved, work can begin on the SRI/FS which will supply the data needed to select an additional remedial action for ground water and surface water if necessary (ROD page 4). The completed supplemental study and final report will identify all possible remedial alternatives. A detailed analysis of the remedial alternatives will be included in the final report and they will be evaluated based upon the nine criteria.

In summary, EPA approves of the FSP and QAPjP but EPA has reservations because the PRPs have declined to conduct analyses at the required detection limits. Therefore, EPA requests that it be provided the opportunity to take split samples from all samples collected by the PRPs' contractor on their behalf. I

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look forward to working with you during the implementation of field activities at the Limestone Road site. It is hoped that the field activities can begin as soon as possible. If you have any questions, you can contact me by telephone at (215) 597-3167. Your cooperation is appreciated.

Sincerely,

S. Andrew Sochanski
S. Andrew Sochanski, P.G.
DE/MD Section

Enclosure

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**Limestone Road Site
Supplemental Remedial Investigation/Feasibility Study**

The following minor errors were noted during the sixth (6th) review of the revised pages of the FSP and QAPjP.

1. In Attachment 1, Geraghty & Miller (G&M) responded to EPA's requirement that the monitoring wells will require the low detection limits (524.2 method). G&M proposed using the CLP Statement of Work, Superfund Analytical Methods for Low Concentration Water for Organics Analysis, dated 6/91. The Low Concentration SOW is used at some sites where applicable. With the Low Concentration SOW, there is inherently more QC and documentation requirements which are consistent with other CLP SOWs. The significant difference between 400 Series Methods and the Low Concentration SOW is with quantitation limits. The instrument detection limits with the 524.2 methods are lower. The Low Concentration SOW has quantitation detection limits which are the levels reported. However, these levels may not be adequate for all data uses (i.e., risk assessment).
2. Quantitation limits for inorganics listed on Table 8 are for soil and sediment samples. These limits are lower than the CRDL values for soil as stated in ILM02.0 (CLP SOW for Inorganics). Quantitation limits were not stated for water samples and they should be follow those listed in ILM02.0. These need to be added.
3. Table 5 included the parameter list and CRQLs for the LOW Concentration SOW; however, there were several compounds in the SOW that were not on Table 5. They are bromochloromethane, 1,2-Dibromomethane, 1,4-Dichlorobenzene, 1,2-Dibromo-3-chloropropane, 1,3-Dichlorobenzene and 1,2-Dichlorobenzene.
4. Table 1 states that several metal will be analyzed by Toxicity Characteristic Leachate Procedure (TCLP). The reference for the method was not included in the revised pages submitted for review. This needs to be included and the holding times need to be listed in Table 2.
5. Ground water samples from all monitoring wells need to be analyzed for total and dissolved metals. Table 1 included total metal analysis only. This is contrary to the proposed ground water sampling scheme.

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